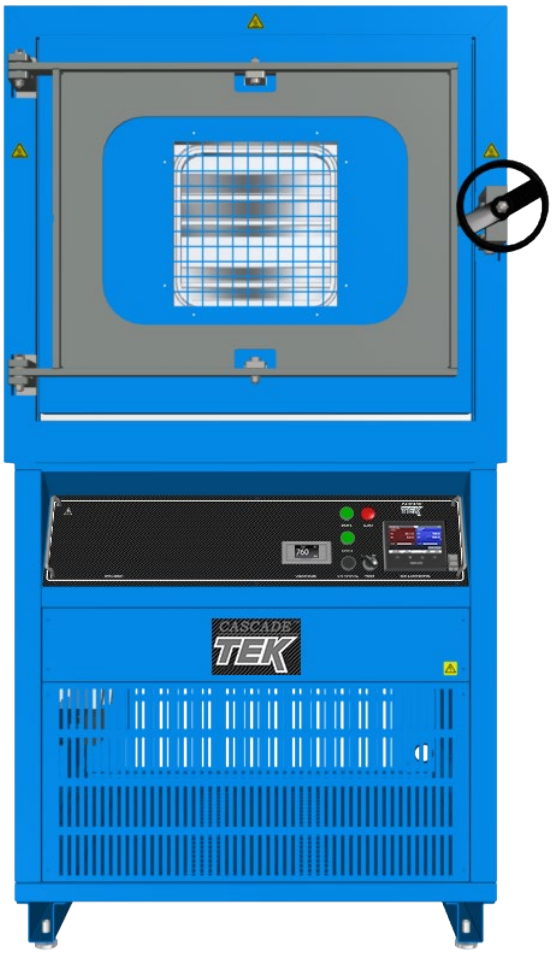
CASCADE™ TEK



Vacuum Control Oven SVO-10-VC

Installation and Operation Manual

These ovens require permanent connect wiring (also known as hardwiring) to a power supply.

Warning: This product contains chemicals, including triglycidyl isocyanurate, known to the State of California to cause cancer as well as birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

¡Advertencia! Este producto contiene sustancias químicas, incluido el triglicidil isocianurato, que el estado de California sabe que causa cáncer, así como defectos de nacimiento u otros daños reproductivos. Para obtener más información, visite www.P65Warnings.ca.gov**.**

Avertissement! Ce produit peut vous exposer à des produits chimiques, dont l'isocyanurate de triglycidyle, reconnu par l'État de Californie pour provoquer le cancer, des anomalies congénitales ou d'autres problèmes de reproduction. Pour plus d'informations, visitez le site www.P65Warnings.ca.gov.

Vacuum Control Oven 220 – 240 Voltage

Part Number (Manual): 4861811

Revision: November 15, 2021

Cascade TEK Part ID Number:

Model Name	SVO-10-VC
Part ID	CTVR1022-H

The Part ID denotes the build type of the model. The manufacturer periodically releases new build types incorporating new features and refinements of existing ones.

Cascade TEK Solutions, LLC is an ISO 9001 certified manufacturer.

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MODEL CERTIFICATIONS

Model Certification and Compliance Statements

SAFETY CERTIFICATIONS

61010 Safety Certified

Electrical, mechanical, and fire hazards

The unit models in this manual are CUE listed by TÜV SÜD America as vacuum ovens for professional, industrial, or educational use in conditions in which no flammable, volatile, or combustible materials are being heated and the unit is being operated under an environmental air pressure range of 22.14 – 31.3 inHg (75 – 106 kPa).

These models have been tested to the following requirements:

CAN/CSA C22.2 No. 61010-1:2012/A1:2018
CAN/CSA C22.2 No. 61010-2-010:2015
UL 61010-1:2012/R:2018-11
UL 61010-2-010:2015
EN 61010-1:2010/A1:2019
EN 61010-2-010:2014

TÜV SÜD America, Inc. is a Standards Council of Canada accredited certification body, an OSHA-recognized NRTL, and an EU Notified Body.

CE Compliant

These unit models meet all required EU EMC, low-voltage, and RoHS directives.

CERTIFICATIONS

INTRODUCTION

Thank you for purchasing a Cascade TEK oven. We know you have many choices in today's competitive marketplace when it comes to constant temperature equipment. We appreciate you choosing ours. We stand behind our products and will be here if you need us.

READ THIS MANUAL

Failure to follow the guidelines and instructions in this user manual may create a protection impairment by disabling or interfering with the unit safety features. This can result in injury or death.

Before using the unit, read the manual in its entirety to understand how to install, operate, and maintain the unit in a safe manner. Ensure all operators are given appropriate training before the unit begins service.

Keep this manual available for use by all operators.

SAFETY CONSIDERATIONS AND REQUIREMENTS

Follow basic safety precautions, including all national laws, regulations, and local ordinances in your area regarding the use of this unit. If you have any questions about local requirements, please contact the appropriate agencies.

SOPs

Because of the range of potential applications, this unit can be used for, the operator or their supervisors must draw up a site-specific standard operating procedure (SOP) covering each application and associated safety guidelines. This SOP must be written and available to all operators in a language they understand.

Intended Applications and Locations

SVO vacuum ovens are engineered for drying, curing, and baking applications under vacuum in professional, industrial, and educational environments. The ovens are not intended for use at hazardous or household locations.

Power

Your unit and its recommended accessories are designed and tested to meet strict safety requirements.

- Always hardwire the unit power feed to a protective earth-grounded electrical source that conforms to national and local electrical codes. If the unit is not grounded properly, parts such as knobs and controls can conduct electricity and cause serious injury.
- Position the unit so operators can quickly and easily disconnect or uncouple the power feed in the event of an emergency.
- Avoid damaging the power feed. Do not bend it excessively, step on it, or place heavy objects on it. A damaged power feed can easily become a shock or fire hazard. Never use a power feed if it has been damaged or altered in any way.
- Use only approved accessories. Do not modify system components. Any alterations or modifications to your oven not explicitly authorized by the manufacturer can be dangerous and are not covered by the manufacturing defect warranty.

CONTACTING ASSISTANCE

Phone hours for Customer Support are 6 am through 4:30 pm Pacific Coast Time (west coast of the United States, UTC -8), Monday through Friday. Please have the following information ready when calling or emailing Customer Support: the **model number**, **serial number, part number,** and **part ID** (see page 17).

support@cascadetek.com
1-888-835-9250
1-971-371-4096
FAX: 1-(503) 640-1366

Manufacturing and Customer Support
Cascade TEK Solutions, LLC
PO Box 625
300 N 26th Ave
Cornelius, OR 97113
USA

MANUFACTURING WARRANTY

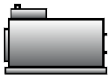
For information on your warranty and online warranty registration please visit:

https://www.cascadetek.com/warranty/

ENGINEERING IMPROVEMENTS

Cascade TEK continually improves its products. As a result, engineering changes and improvements are made from time to time. Therefore, some changes, modifications, and improvements may not be covered in this manual. If your unit's operating characteristics or appearance differs from those described in this manual, please contact your Cascade TEK dealer or customer service representative for assistance.

Vacuum Pump Options



SVO-10-VC ovens can be ordered with one of several vacuum pump types installed inside the oven utility cabinet. These pumps vary in pump down flow rates and suitability for different baking applications.

Refer to the vacuum pump manufacturer manual included with the oven for specifications and compatibility with applications. Consult the manual for operating requirements such as pump oil and sorbent use.

Damage Caution: Unless explicitly designed to draw full atmosphere pressure for extended periods, vacuum pumps can be quickly damaged or destroyed if exposed to streaming external atmosphere. For example, if a pump is attempting to vacuum down the oven chamber and the chamber door is open. Always consult the pump manual for the maximum allowed continuous inlet pressure.

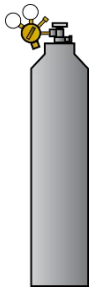
Shipping Locks: The roughing pump comes with built-in shipping locks to prevent damage during transit. See page 23 for instructions on disengaging the locks prior to putting the oven into operation.

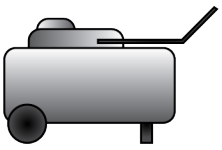
Compressed Air Supply Required

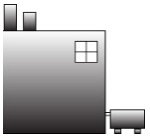
Compressed air provides the mechanical pressure needed to operate the automated vacuum and gas backfill vent valves on the back of the oven. The oven chamber cannot be evacuated or auto backfilled without a compressed air supply.

Use ¼ inch OD (outside dimension) tubing to connect the supply to the ¼ inch push fitting on the back, left side of the oven, labeled Air 70 PSI.

The oven requires **70 psi** of air pressure delivered at the port to function. **Never exceed 80 psi**.





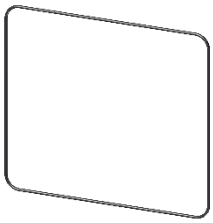


Building Pneumatic Supply

GASKET CHEMICAL VULNERABILITIES

The oven comes with a *Viton®* gasket built into the oven door. The gasket must seal against the un-nicked contact surface on the oven body in order for the oven chamber to hold vacuum.

The gasket is a low wear, long-duration component that is rated to 220°C and typically replaced only during scheduled services on the oven. However, the gasket is attacked by ketones, low molecular weight esters, and compounds containing nitros. Exposing the gasket to these may damage its integrity and require an early replacement. The gasket is a consumable component and is not covered under the manufacturer warranty.



RECEIVING YOUR OVEN

INSPECT THE SHIPMENT

Safe delivery becomes the responsibility of the carrier when a unit leaves the factory. **Damage sustained during transit is not covered by the manufacturing defect warranty**.

When you receive your unit, inspect it for concealed loss or damage to its interior and exterior. If you find any damage to the unit, **follow the carrier's procedure for claiming damage or loss**. Save the shipping carton until you are certain that the unit and its accessories function properly.

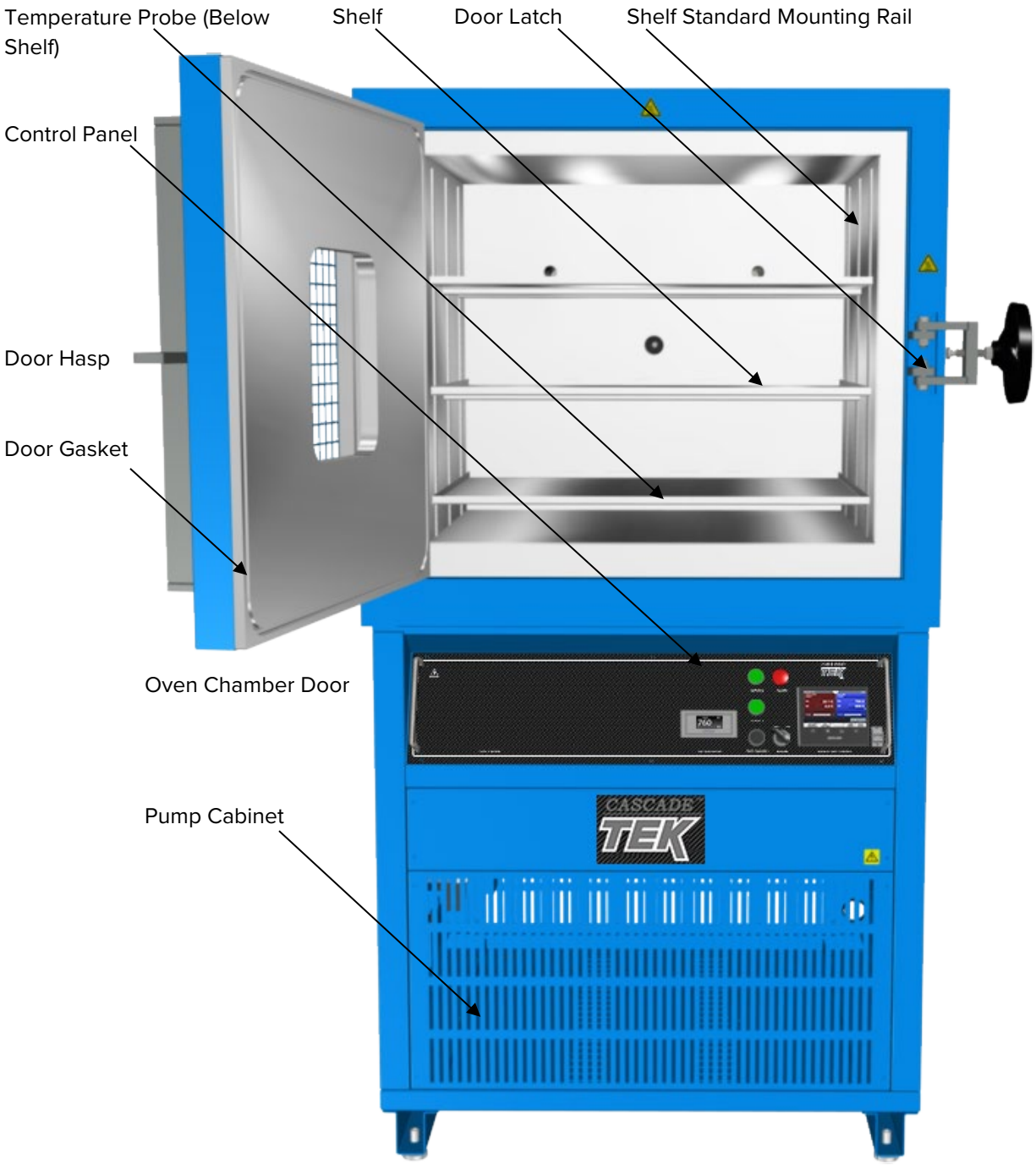
1. Carefully inspect the shipping carton for damage.
2. Report any damage to the carrier service that delivered the unit.
3. If the carton is not damaged, open the carton and remove the contents.
4. Inspect the unit for signs of damage. Use the orientation images in this chapter as a reference.
5. The unit should come with an Installation and Operation Manual, a profile programming manual, an operator manual for the vacuum display, and a manufacturer vacuum pump manual.
6. Verify the correct number of accessory items has been included.
7. Carefully check all packaging for accessories before discarding.

Included Accessories:

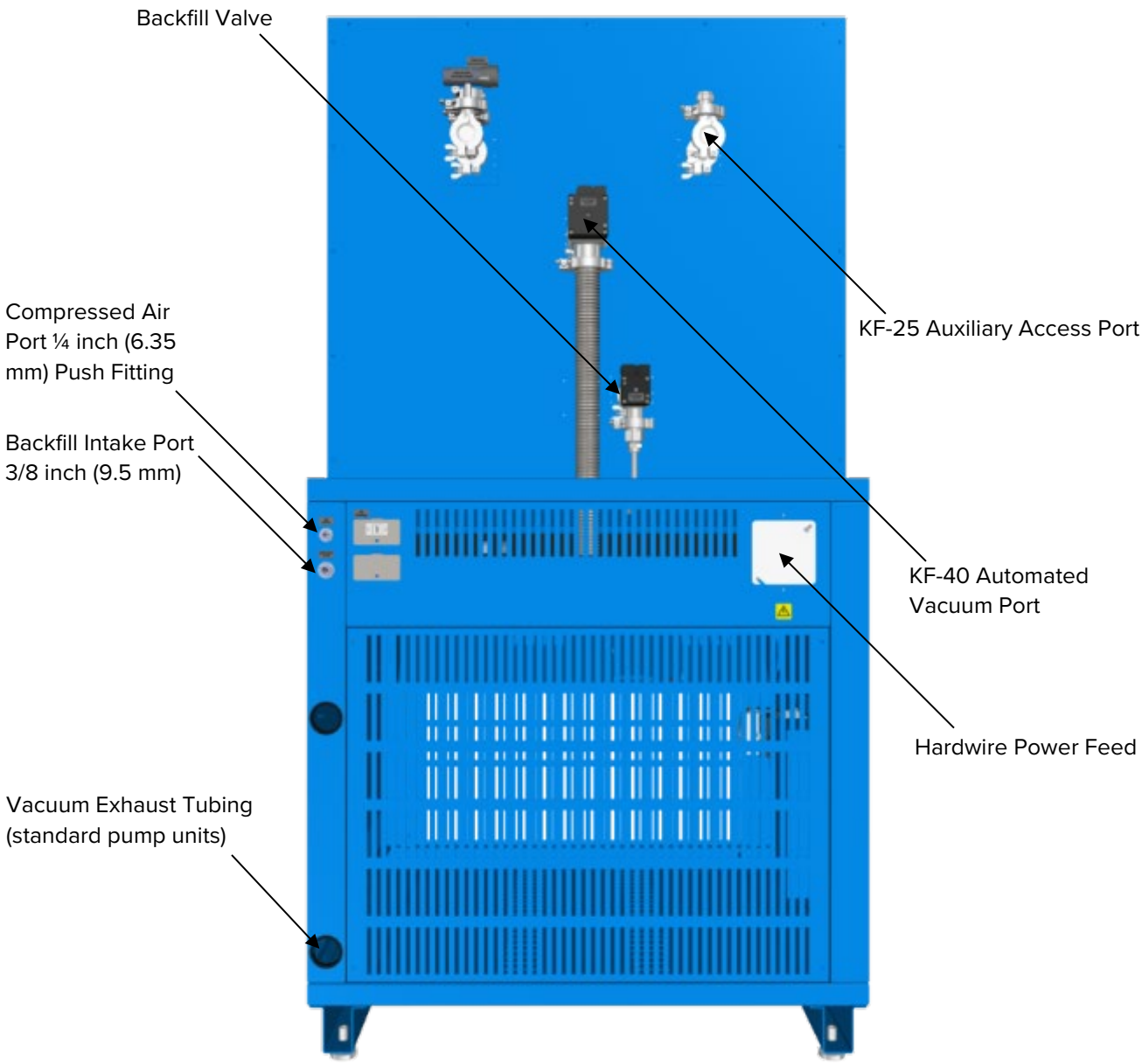
SVO-10-VC	Leveling Feet	Shelf	Shelf Clip
	4	3	18
			

ORIENTATION IMAGES

SVO-10-VC



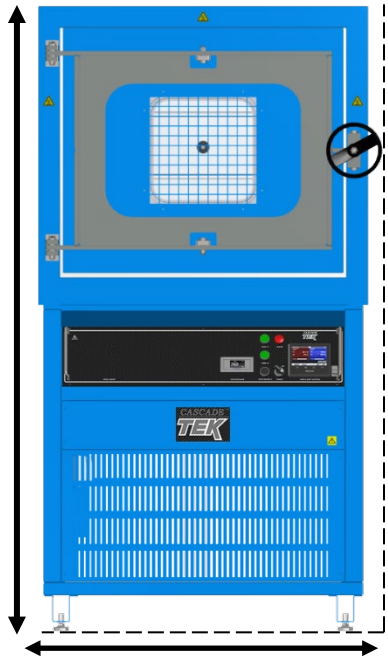
Back of Oven – SVO-10-VC



Dimension Visuals

SVO-10-VC

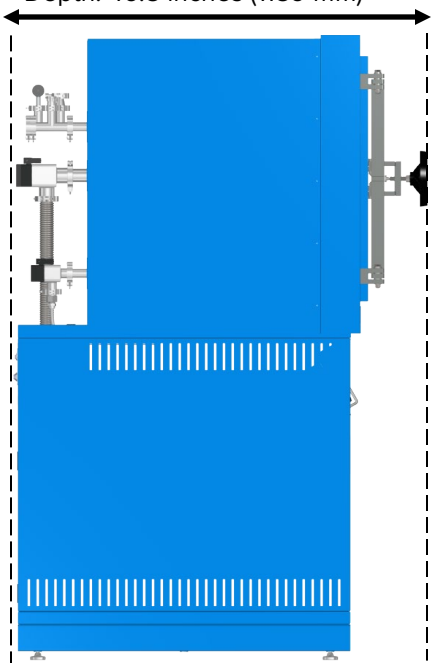
Height: 70.4 inches (1787 mm)



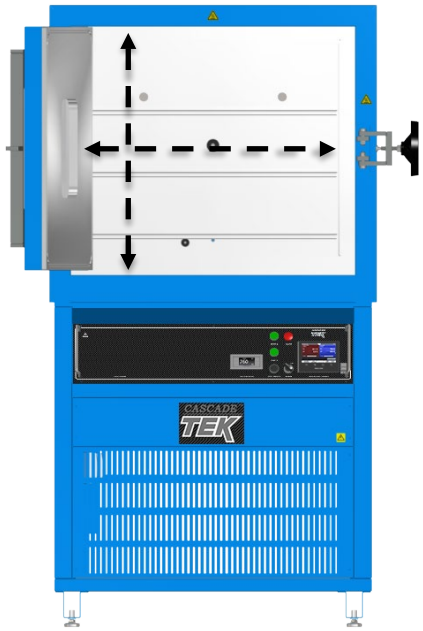
Width: 38.7 inches (983 mm)

Exterior

Depth: 46.8 inches (1189 mm)



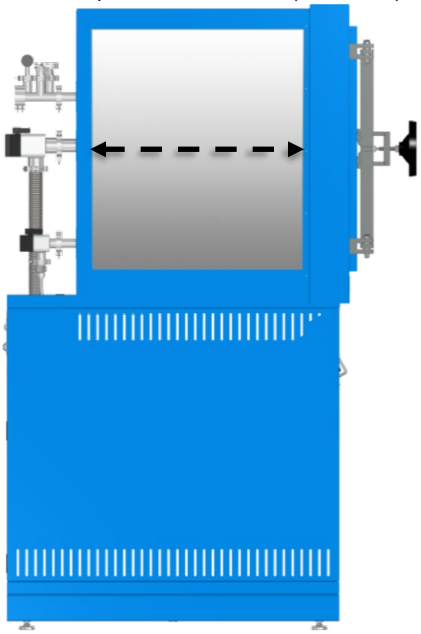
Chamber Height: 24.5 inches (622 mm)



Chamber Width: 28.8 inches (730 mm)

Interior

Chamber Depth: 26.0 inches (660 mm)



Shelf

Depth:25.0 inches (635 mm)

Width: 28.2 inches (717 mm)

RECORD DATA PLATE INFORMATION

Record the unit **model number**, **serial number**, **part number**, and **part ID** below for future reference. Customer Support needs this information to provide accurate help during support calls and emails.

- The data plate is located on the back, right side of the oven, above the compressed air inlet port.

MODEL NO:	
SERIAL NO:	
PART NO:	
PART ID:	

POWER HARDWIRING REQUIREMENT

The oven requires permanent connect wiring (commonly known as hardwiring). Wiring to the power source **must be performed by a qualified electrical technician.** All other Installation steps may be performed by the operator.

INSTALLATION PROCEDURES CHECKLIST

For installing the unit in a new workspace location.

Pre-Installation

- ✓ Verify that a compressed air supply is available and can be connected to the oven. See page 11.
- ✓ Check that the required ambient conditions for the unit are met, page 20.
- ✓ Check that the spacing clearance requirements are met, page 20.
  - Unit dimensions may be found on page 55.
- ✓ Check that a suitable permanent connect power supply is present, page 21.

Install the oven in a suitable workspace location

- ✓ Review the lifting and handling instructions, page 22.
- ✓ Install the leveling feet, page 22.
- ✓ Install the oven in its workspace location, page 22.

Set up the oven for use

- ✓ Disengage the vacuum pump shipping locks, page 23.
- ✓ Clean the chamber and shelving if needed, page 24.
- ✓ Install the shelving in the oven chamber, page 25.
- ✓ Connect the oven to its pressurized air supply source along with any optional backfill gas supply, page 26.
- ✓ Connect the oven vacuum pump exhaust to a ventilation system to remove outgassed byproducts from the workspace area, page 27.
- ✓ Verify the chamber is empty and clean, page 28.
- ✓ Hardwire the oven to its power supply, page 28.

Required Ambient Conditions

This oven is built for use indoors, at room temperatures between **15°C and 40°C (59°F and 104°F)**, at no greater than **80% Relative Humidity** (at 25°C / 77°F).

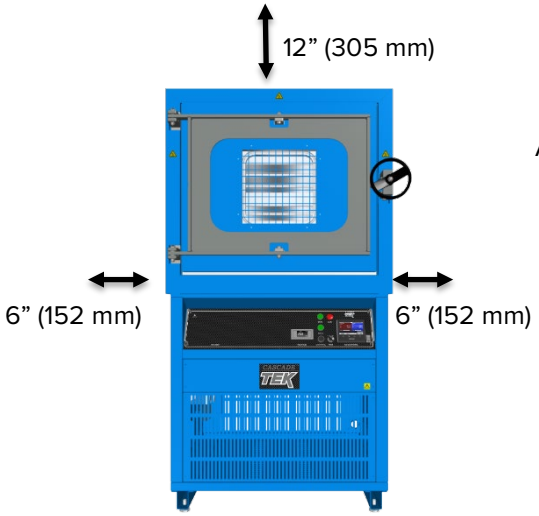
Operating outside these conditions may adversely affect the oven temperature performance.

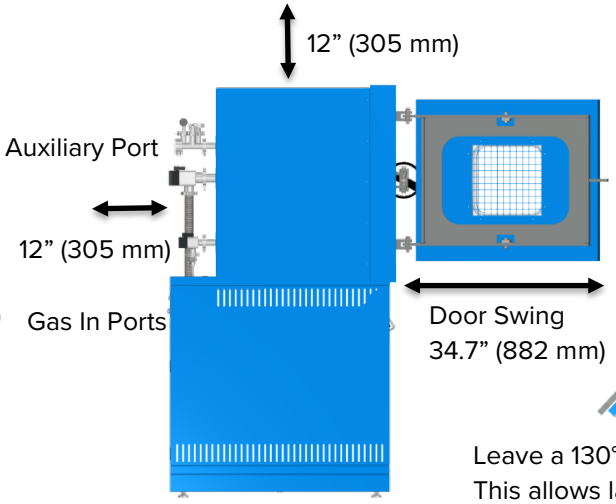
When selecting a location to install the unit, consider all environmental conditions that can adversely impact its temperature performance. These include:

- Proximity to other ovens, autoclaves, and any device that produces significant radiant heat
- Heating and cooling vents or other sources of fast-moving air currents
- High-traffic areas
- Direct sunlight

Required Clearances

These clearances are required to provide airflows for ventilation and cooling.





Leave a 130° arc for the door swing. This allows large sample trays to be removed safely from the chamber without damaging the door seal or metal sealing surfaces.

6 inches (152 mm) of clearance is required on the sides.

12 inches (305 mm) of headspace clearance is required between the top of the unit and any overhead partitions.

Do not place objects on top of the oven.

Vacuum, backfill, and access ports are located on the back of the oven. Leave sufficient clearance for operators to safely access these ports.

POWER SOURCE REQUIREMENTS

When selecting a location for the oven, verify each of the following requirements is satisfied:

Power Source: The power source must match the voltage and amperage requirements listed on the unit data plate.

- The unit is intended for 50/60 Hz applications at the following amperage:

Model	AC Voltage	Amperage
SVO-10-VC	220 – 240	30

- The power source must be **protective earth grounded and single phase**.
- The power source must conform to all national and local electrical codes.
- The unit may be damaged if the supplied voltage varies by more than 10% from the data plate rating.
- A dedicated separate circuit for the oven is recommended to prevent possible loss of product due to overloading or failure of other equipment on the same circuit.

Switch or circuit-breaker: A wall switch or circuit-breaker must be used in the building installation to protect against overcurrent conditions.

  - The recommended circuit breaker for the wall power source is **35 amps.**

Power Feed Disconnect: The oven must be positioned so that all operators have access to the power feed disconnect in case of emergencies.

- The disconnect must be near the equipment and within easy reach of the operator.
- The disconnect must be marked as the disconnecting device for the equipment.

Internal Circuit Breakers: The oven comes equipped with multiple internal circuit breakers. Resetting these is **a service-level procedure**. The cause of the overcurrent conditions that tripped the breakers must be identified and repaired prior to resetting.

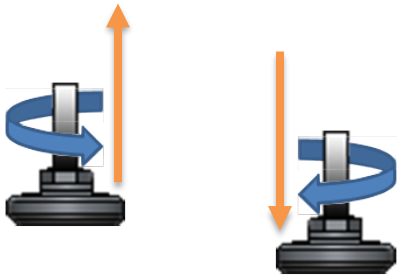
LIFTING AND HANDLING

The oven is heavy. Use appropriate lifting devices that are sufficiently rated for these loads. Follow these guidelines when lifting the oven:

- Lift the oven only from its bottom surface.
- Doors, handles, and knobs are not adequate for lifting or stabilization.
- Restrain the oven completely while lifting or transporting it so it cannot tip.
- Remove all moving parts, such as shelves and trays, and lock doors in the closed position during transfers to prevent shifting and damage.

LEVELING

Install the 4 leveling feet in the corner holes in the bottom of the unit. The unit must be level and stable for safe operation.



Note: To prevent damage when moving the unit, turn all 4 leveling feet so that the leg of each foot sits inside the unit.

INSTALL THE OVEN

Install the unit in a workspace location that meets the criteria discussed in the previous entries of the Installation section.

- **Do not connect the oven to its power source at this time.**

Note: The manufacturer recommends that this procedure be performed by a qualified electrical technician. The oven should remain disconnected from its power source throughout the procedure.

Disengage the Vacuum Pump Locks

The oven vacuum pump has four internal shipping locks on its base to cinch it to the floor of the electronics cabinet. This prevents damage from impacts or shifting during transit. The locks must be disengaged prior to placing the oven into operation. If the locks remain engaged, vibrations from the vacuum pump can cause the oven to rattle.

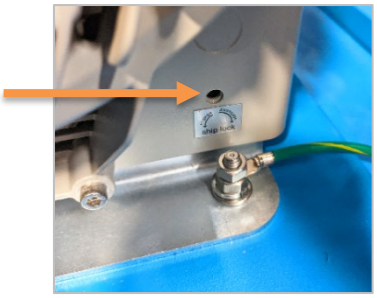
Required Tools:

- A Phillips Screwdriver
- T-Handle Allen Wrench (Included in the roughing pump document package)

1. Use the Phillips screwdriver to remove the front and back cabinet access panels.

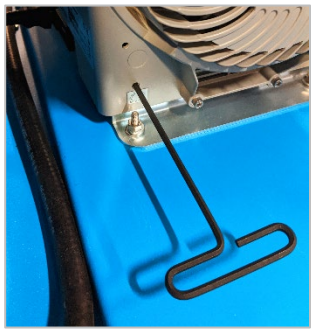
2. One at a time, insert the Allen wrench into each lock access port on the roughing pump.

- The 4 ports are indicated by labels below each port.
- The order of disengaging the locks does not matter. Begin with any of the ports.



3. Turn the Allen wrench to the right until each lock spins freely. This disengages the locks. Disengage all 4 locks.

- If a lock will not turn, move to another lock. Disengaging the next lock may relieve tension on the first lock, allowing it to be released.



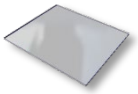
4. Once all the locks are disengaged, reinstall the front and back cabinet access panels.

INSTALLATION CLEANING

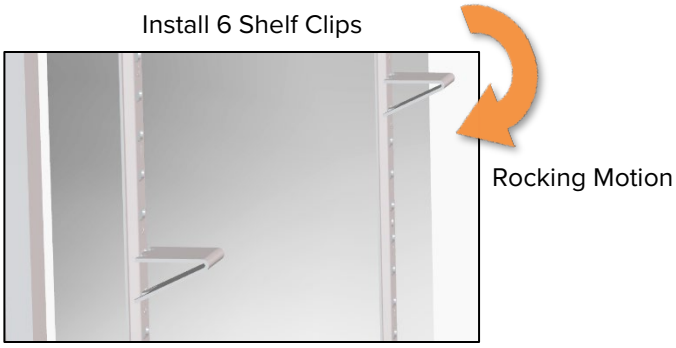
The manufacturer recommends cleaning the shelving and oven chamber prior to installation of the shelving in the chamber. The unit was cleaned at the factory but may have been exposed to contaminants during shipping.

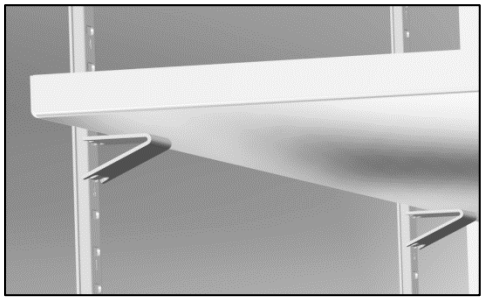
- Remove all wrappings and coverings from shelving prior to cleaning and installation.
- See the **Cleaning** topic in the Operator Maintenance section (see page 53) for more information on how to clean the oven chamber and shelving.
- **Do not clean with deionized water.**

SHELVING INSTALLATION



To ensure accurate temperature measurement, **one shelf bottom must be in close proximity to the oven temperature probe.** This probe extends out from the chamber back wall. Do not place the shelf in direct contact with the probe.





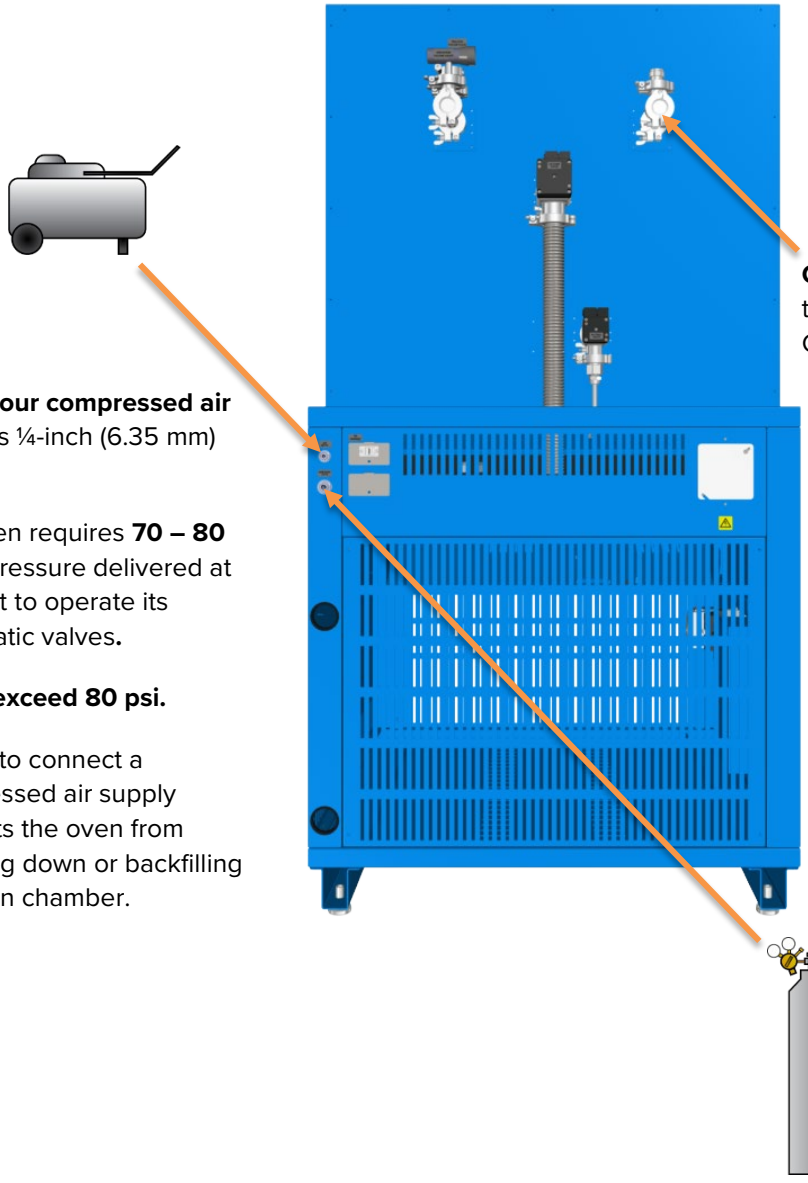
1. Install the shelf clips in the slots of the shelf standard mounting rails located on the sides of the chamber interior, 6 clips per shelf.

    a. Squeeze each clip, insert the top tab first, and then the bottom tab using a rocking motion.

2. Set the shelves on the clips.

    a. Verify the shelves are level.

CONNECT GAS SUPPLIES



Optional: Connect equipment to the KF-25 auxiliary port. Comes with a blank and clamp.

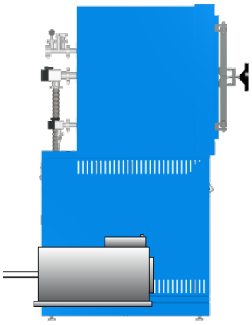
1. Connect your compressed air supply to this ¼-inch (6.35 mm) push fitting.

- The oven requires **70 – 80 psi** of pressure delivered at this port to operate its pneumatic valves**.**
- **Never exceed 80 psi.**
- Failure to connect a compressed air supply prevents the oven from pumping down or backfilling the oven chamber.

Inert Backfill Gas Supply Optional: Connect gas nitrogen or another inert gas supply to this **3/8" (9.5 mm) push fitting** for backfilling the oven chamber.
Do not exceed 15 psi of pressure delivered at the port.

Note: Outgassed byproducts may be hazardous to or noxious for operating personnel. Vacuum pump exhaust should be vented to a location outside the workspace in a safe manner in accordance with all applicable laws, ordinances, and regulations.

VENT THE PUMP EXHAUST

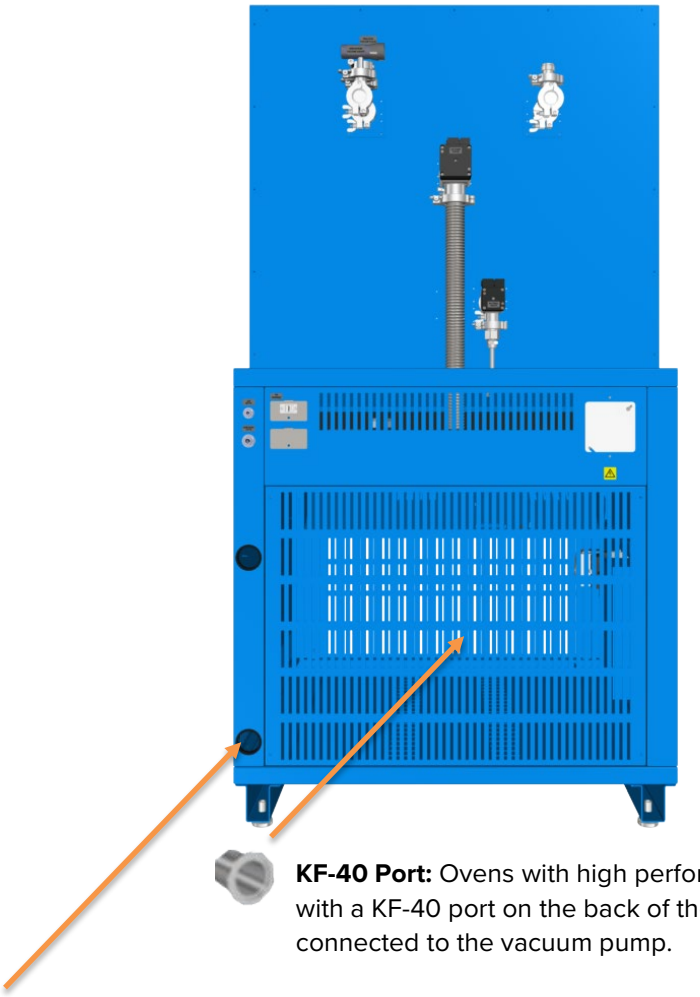


The oven comes with a vacuum pump installed in the electronics cabinet at the base of the oven. Failure to vent the pump outside of the cabinet will result in outgassed byproducts coating oven electrical systems and poses a potential hazard to oven operators.

Pump Cabinet and Electronics

The cabinet housing the vacuum pump also contains high-voltage electronics and should only be accessed by a qualified electrical technician.

Vacuum Exhaust Connection Options



KF-40 Port: Ovens with high performance vacuum pumps come with a KF-40 port on the back of the electronics cabinet connected to the vacuum pump.

½ Inch (12 mm) ID Hose: Run the hose outside the port located on the lower left side of the cabinet.

Verify the Oven Chamber is Empty

Prior to placing the oven into operation, verify the oven chamber is clean and all shipping dunnage and any shelf wrappings have been removed.

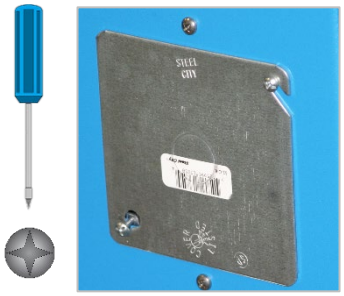
Failure to do so may result in damage to the oven chamber interior or vacuum pump.

Hardwire the Oven to Its Power Supply

The oven may now be connected to a power supply that meets the requirements on page 21.

Power Braid: Each oven comes provided with an integral 6-inch (150-mm) wire braid consisting of:

- Two 10-gauge hot wires – black, red
- One 10-gauge earth ground – green-yellow



Remove the cover to expose the power wire braid. Use a Phillips-head screwdriver.

The oven must be earth grounded using the protective conductor terminal (green with yellow stripe wire). Do not remove the protective conductor (earth connection). Removing the protective conductor will negate the oven's protections against potentially dangerous electric shocks and create a potential fire hazard.

GRAPHIC SYMBOLS

The oven is provided with graphic symbols on its exterior surfaces. These identify hazards and the functions of the adjustable components, as well as important notes in the user manual.

Symbol	Definition
	Consult the user manual Consulter le manuel d'utilisation
	AC Power Repère le courant alternatif
	Potential shock hazard Risque de choc électrique
	Recycle the unit. Do not dispose of in a landfill Recycler le four. Ne jetez pas dans une décharge
	Protective earth ground Terre électrique
	Caution hot surface Attention surface chaude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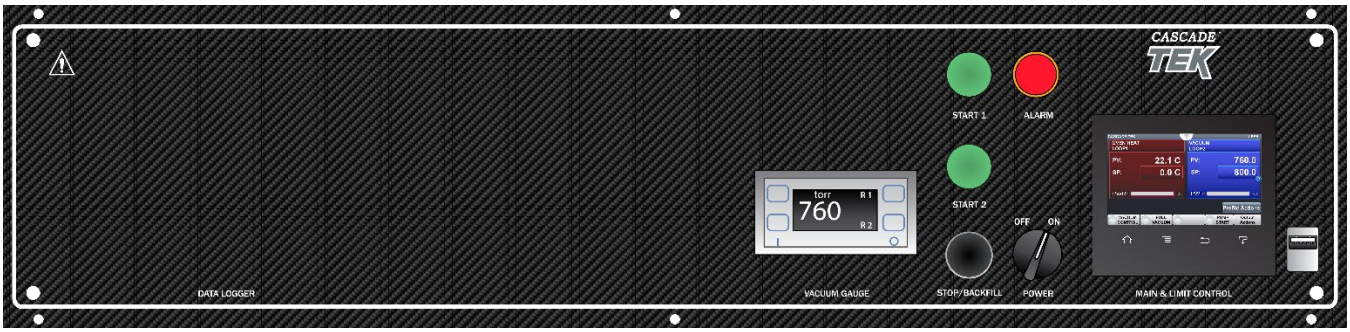
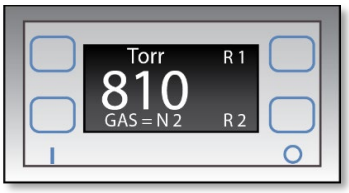
CONTROL OVERVIEW



Control Panel

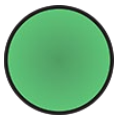
Vacuum Gauge Display – Backfill Limit

Shows the chamber pressure level in Torr and millitorr (mTorr). The gauge this display connects to measures the pressure of pure nitrogen (N_2) and is used to control the automated backfill function. Backfilling is commonly done using N_2 or other inert gases.



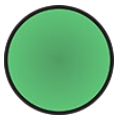
Start Buttons

The Start 1 button launches an automated heating recipe, Profile 1.



The Start 2 button launches Profile 2.

For the profiles to launch, the Pump Start function must be turned on from the Main controller homepage.



Stop / Backfill

Pushing and releasing the button aborts a running profile.

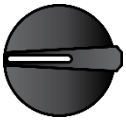
Pressing and holding the button backfills the oven chamber. Both vacuum functions must be turned off before the oven will backfill. See page 48.

Alarm Light

The red alarm light illuminates steadily when the Oven Limit is activated.

Power Switch

Controls all power to the oven and its systems.



Main and Limit Controller – Homepage

Home

Returns the display to the homepage.

Menu

Accesses the **password** for unlocking the heating profile programming menu.

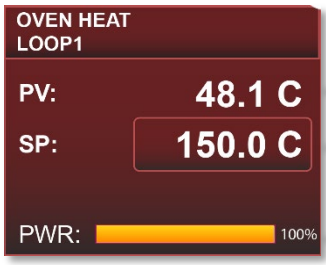
Return

Returns the display to the previous page or menu.

Help

This button has no assigned functions.

Oven Shelving Temperature Tab - Homepage



The current oven chamber shelving temperature, 48.1°C

A Constant Temperature Setpoint (SP) of 150.0°C entered on the setpoint button.

Oven heating with 100% power (PWR)

PV (Process Value):

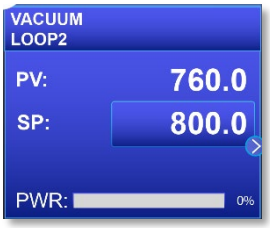
- When atmosphere is present in the chamber, the Process Value shows the gas temperature.
- When the oven chamber is pumped down, the Process Value shows the current chamber shelving temperature.

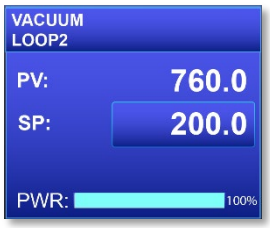
SP (Setpoint) button: A target, constant temperature the oven heats to and maintains when a profile is not running. Setting the setpoint to zero effectively gives the oven an unheated resting state.

PWR: The power bar indicates the percentage of maximum power the oven controller is calling for to heat the oven chamber.

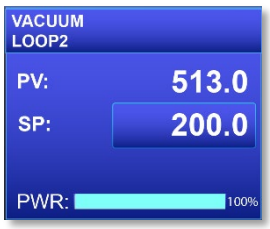
Vacuum Control System Tab - Homepage

~760 Torr – Room atmosphere pressure at or near sea level





Not Pumping Down



Chamber Pumping Down

PV: The present chamber pressure level, down to 1 Torr.

SP (Setpoint) button: The Vacuum Control setpoint button. The oven pumps down to this target when the Pump Start and Vacuum Control functions are on.

PWR: Indicates the percentage of controlled air pressure to be used in opening the oven vacuum valve. This pressure level is not actually applied until the Vacuum Control function is turned on. **This power level is not used by the Full Vacuum function.**

Note: Both vacuum functions can be manually turned on from the homepage by tapping the button or turned on as a heating profile step parameter. The button indicator disk changes from gray to green when turned on.

Vacuum Control

The Vacuum Control function dynamically adjusts the chamber vacuum valve to achieve and then maintain a pressure level between room atmosphere pressure and 1 Torr. This level can either be set by the operator using the homepage vacuum tab setpoint or programmed as part of an automated heating profile.

Full Vacuum

The Full Vacuum function opens the oven vacuum valve all the way, supplying the maximum draw of the pump to the oven chamber. It can pump down the chamber to below 1 Torr **and overrides the Vacuum Control function**. The maximum achievable Full Vacuum level depends in part on which pump type is installed in the oven and the rate of outgassing from products or samples in the chamber.

Pump Start

Turns on the oven vacuum pump.

- **Pump Start must be on** for the Vacuum Control or Full Vacuum functions to pump down the chamber.
- Pump Start must always be manually turned on by an oven operator. It cannot be set to automatically turn on as part of a profile.

An operator must be present while the oven is pumping down from room pressure to verify the system is sealed.

Profile Actions

This button brings up heating profile menu options. These include:

- Running a profile (launching).
- Creating a new profile.
- Editing an existing profile.
- Exporting profiles.

Note: You must log in to create or edit profiles. These actions are hidden when not logged in.

Output Actions

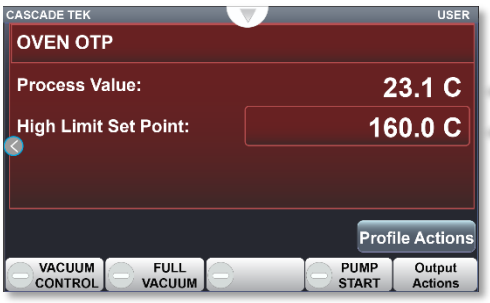
Brings up the output menu, showing each output channel and the data type assigned to it.

Right Arrow

Tapping the arrow brings up the Oven Limit page.

Oven Limit Page

The Oven Limit (OTP) system sets an independent heating cutoff temperature to help safeguard the oven in the event of a hardware failure or external event. See the Oven Limit topic on page 39 for more information.



The current oven temperature

High temperature heating cutoff setpoint button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OPERATION

Safe operation of the oven is dependent on the actions and behavior of the oven operators. **Operating personnel must read and understand the Operating Precautions in this section prior to operating the oven.** The operators must follow these instructions to prevent injuries and to safeguard their health, environment, and the materials being treated in the oven, as well as to prevent damage to the oven. Failure to adhere to the Operating Precautions, deliberately or through error, is a hazardous behavior on the part of the operator.

Le fonctionnement sûr du four dépend des actions et du comportement des opérateurs du four. Le personnel d'exploitation doit lire et comprendre les consignes de sécurité et les précautions d'utilisation de cette section avant d'utiliser le four. Les opérateurs doivent suivre ces instructions pour prévenir les blessures et protéger leur santé, leur environnement et les matériaux traités dans le four, ainsi que pour éviter d'endommager le four. Le non-respect des consignes de sécurité et des précautions d'utilisation, délibérément ou par erreur, est un comportement dangereux de la part de l'opérateur.

OPERATING PRECAUTIONS

- Do not use this oven in unsafe improper applications that produce flammable or combustible gases, vapors, liquids, or fuel-air mixtures in quantities that can become potentially explosive.
- Outgassed byproducts may be hazardous to or noxious for operating personnel. Vacuum pump exhaust should be vented to a location outside the workspace in a safe manner in accordance with all applicable laws, ordinances, and regulations. Do not operate the oven in an unsafe area with noxious fumes.
- Do not use this oven for applications heating hazardous fibers or dust. These materials can become airborne and come into contact with hot surfaces.
- Individual ovens are not rated to be explosion-proof. Follow all building certification requirements and laws for Class I, II, or III locations as defined by the US National Electric Code.
- The bottom surface of the chamber should not be used as a work surface. It runs hotter than the shelf temperatures. Never place samples or product on the oven chamber floor.
- Do not place sealed or filled containers in the oven. These may burst open when the chamber is under vacuum.
- Do not place alcohol or mercury thermometers in the oven. With improper use, they can rupture.
- Do not move the oven until it has finished cooling.

Warning Hot Surfaces: These areas are marked with Hot Surface labels. Proper protective equipment should be employed to minimize the risk of burns.

Avertissement Surface Chaude: Ces zones sont marquées avec des étiquettes de surface chaude. Un équipement de protection approprié devrait être utilisé pour minimiser le risque de brûlures.

THEORY OF OPERATION

Vacuum and Vacuum Automation

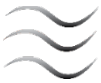
Atmosphere is pumped out of the oven chamber through a pneumatic vacuum valve on the back of the oven and then exits through the roughing vacuum pump connected to the valve. The valve position is controlled by either the Full Vacuum or Vacuum Control functions. Full Vacuum opens the valve all the way, allowing the maximum flow rate to pump down the chamber. The Vacuum Control function dynamically positions the valve to achieve and then maintain a vacuum setpoint between room pressure and 1 Torr in the chamber.

The pump is turned on or off using the Pump Start function. The current vacuum level is displayed on both the Vacuum Gauge display and the Main controller homepage vacuum tab.

The oven is intended for use in closed-cycle applications with the oven chamber partly or fully pumped down while controlling temperature. The lowest possible chamber pressure is dependent on both the pump type and the volume of outgassing from product or samples in the chamber.

Heating the oven with atmosphere in the chamber can oxidize the chamber surfaces.

Backfilling



The oven controller opens the pneumatic vacuum port when either the Full Vacuum or Vacuum Control functions are on. As soon as both these functions are turned off, the oven closes the vacuum valve, then opens the automated backfill port. This backfills the chamber to approximately 600 Torr. To restore the chamber to full room pressure (approximately 810 Torr N_2 / 760 Torr atmosphere), the operator manually presses and holds the Stop / Backfill button on the control panel.

The oven backfills using room atmosphere unless a clean or inert gas supply is connected to the push fitting Backfill / Vent port fitting on the back, right side of the oven. The maximum allowed backfill pressure is 15 psi of delivery at the port. Inert gases, such as nitrogen (N_2), are typically used to avoid oxidizing the chamber surfaces or product as well as avoid particulate contamination and introducing water vapor into the hot chamber. Clean air can also be used to avoid water and particulate contamination.

Temperature Modes

The oven operates in one of two heating modes: A single constant temperature setpoint or executing an operator-programmed, multistep heating profile.

Heating in a Vacuum

In conventional ovens, powered elements transfer heat into the chamber air. The heated air then circulates by natural convection or blower fan action, surrounding the product on the shelves and gradually bringing it to temperature. In a vacuum oven, heat transfer takes place in part through infrared radiation. However, a significant portion happens through conduction. The oven heating elements located outside the chamber walls and floor transfer heat to the shelves. Each shelf then carries heat to the products or samples resting on it via conduction.

The displayed oven temperature may change when pumping down the oven. This reflects the chamber probe transitioning from measuring air temperature to shelf temperature, followed by a redistribution of thermal energy in the vacuum environment. This typically presents as a drop in temperature followed by an apparent rise. The drop may take place even if the oven is actively heating.

Heating Control

The controller monitors the oven chamber shelving temperature using a thermocouple temperature probe extending into the chamber from the back wall. In a vacuum environment, the probe senses the temperature of the shelf placed immediately above it. Placement of a shelf in close proximity to, but not in contact with the probe, is crucial for accurate measurement of the shelving temperature in the vacuum chamber.

The unit uses Proportional – Integral – Derivative (PID) control to avoid significantly overshooting the setpoint. The rate of heating will slow as the chamber temperature approaches the target temperature. If the chamber temperature is above the setpoint, the unit uses minimum heating to control the rate of cooling and avoid dipping below the setpoint.

PID loops also optimize heating rates to compensate for the temperature environment around the unit. If the unit is operating in a cool room, the controller will increase the length of the heating pulses. Likewise, when operating in a warm room the unit uses shorter pulses. If the ambient temperature conditions change significantly, there may be minor over or undershoots as the unit adapts.

The oven relies on natural heat radiation for cooling. It can achieve a low-end operating temperature of the ambient room temperature plus the oven waste heat. The oven chamber is well insulated when sealed and can take a day or longer to passively cool to ambient temperature.

Oven Limit (OTP) System

The oven controller contains a heating cutoff system with independent circuitry connected to a redundant temperature sensor probe inside the oven chamber. This oven limit system depowers the oven heating elements whenever the chamber temperature exceeds the current limit setting. This safeguards the oven in the event of a failure of the main temperature control circuitry or main temperature sensor probe.

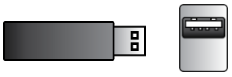
The oven limit is set by the operator to a minimum of 10˚C above the highest temperature the oven is intended to be run at during your baking application. Overriding the oven limit system voids the oven manufacturing defect warranty in the event of an overtemperature event.

PUT THE OVEN INTO OPERATION

Perform the following procedures and steps to put the unit into operation after installing it in a new workspace environment.

✓ **Turn on the oven**

✓ **Optional:** Back up the oven controller.



- The manufacturer recommends backing up your oven controller configuration. See the **Logging In and Out** procedure on page 41 and the **File Export and Import** procedure on page 42.

✓ Perform the **Set the Oven Limit Temperature** procedure on page 43.

✓ Perform the **Latch the Oven Chamber Door** procedure on page 44.

✓ Perform the **Pump Down the Oven Chamber** procedure on page 45.

- Hold the oven chamber under vacuum for **a minimum of 10 minutes** to verify the integrity of the vacuum system.

✓ Review how to set the Operating Temperatures

- Perform the **Setting a Constant Temperature** procedure on page 49, **OR**
- Program multistep **Heating Profiles**, page 49.
- The oven chamber should always be under vacuum prior to heating or chilling.

The oven is now ready for use.

OPERATION

You must be logged in on the temperature and limit controller to perform the following:

- Exporting or importing configuration files.
- Programming or editing profiles.

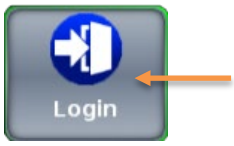
Profiles can be launched, paused, or terminated without logging in.

LOGGING IN AND OUT

1. Access the Main Menu

- Tap the Menu icon

2. Login



- Tap the Login icon

3. Enter the Controller password

- Type **ctek**

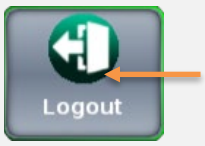
Note: Ensure that the password is in all lower case.

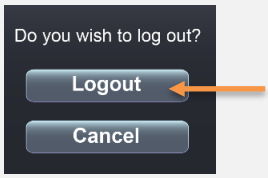
- Tap the Enter button

You may now return to the Homepage

- Tap the Home icon

Logging Out





The manufacturer recommends logging out after finishing file management and profile tasks.

- Tap the Logout icon in the Main Menu
- Confirm Logout

End of Procedure

Changing the Password

The default oven password is **ctek**. The password may be changed using Watlow Composer™ software. However, Cascade TEK **cannot recover a lost password**.

Note: A USB must be inserted into the USB-A drive on the control panel next to the display screen to access the File Transfer menu.

File Export and Import

The manufacturer recommends exporting the controller software configuration when first putting the oven into use. Profiles can also be imported and exported using this procedure.

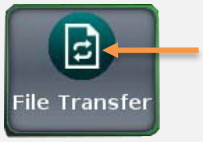
1. Access the Main Menu

- Tap the Menu icon

2. Login

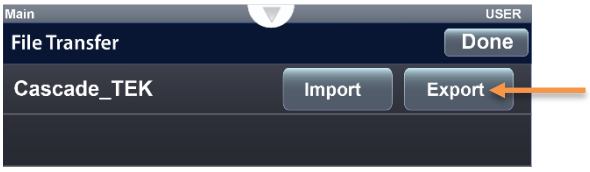
- See the Login procedure on page 41.

3. Access the File Transfer Menu



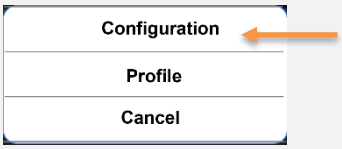
- Tap the File Transfer menu button.

4. Choose Import or Export



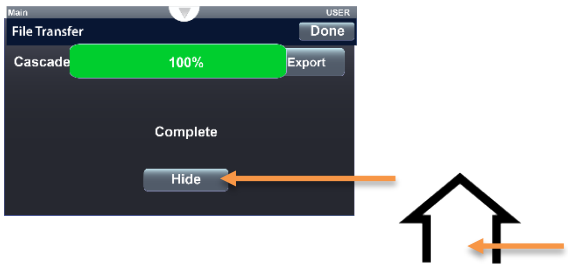
- Tap the Export button.

5. Export the Controller Configuration



- Tap Configuration to automatically begin the file export.
- The configuration should begin downloading to the USB drive.

You may now return to the Homepage



- When the export is complete, tap Hide to dismiss the export menu.
- Tap the Home icon.

End of Procedure

SET THE OVEN LIMIT (OTP) TEMPERATURE

Note: Test the oven limit system once per year for functionality.

Set the oven limit threshold where the independent Temperature Limit circuitry cuts off heating of the oven chamber.

Considerations when setting the oven limit cutoff:

- Set the limit prior to activating heating.
- The oven limit cutoff setpoint should be set **at least 10°C** above the highest temperature of your baking application.

1. Tap the right chevron button to bring up the Oven Limit page.
2. Tap the High Limit Set Point button.
3. Set the temperature cutoff limit.
4. Return to the Homepage.

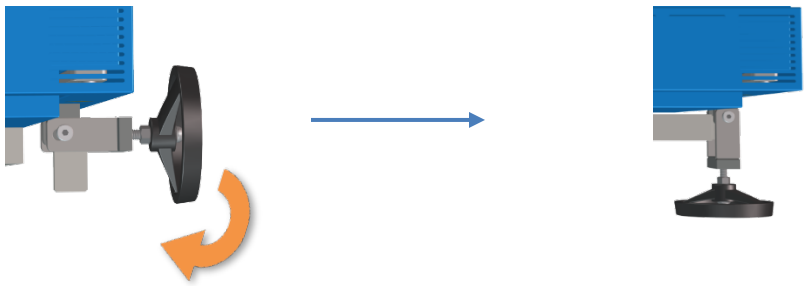
End of Procedure

Latch the Oven Chamber Door

Ensure the oven door is securely latched before placing the chamber under vacuum.

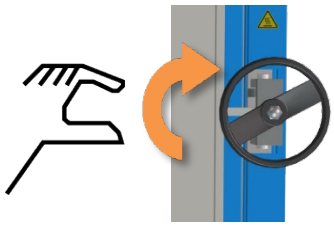
1. Position the door handle.

- Swing the handle wheel all the way to the left, until it is facing forward.



2. Secure the chamber door.

- Using one hand, turn the handle wheel clockwise (to the right) until the tongue of the handle wheel touches the hasp on the chamber body.



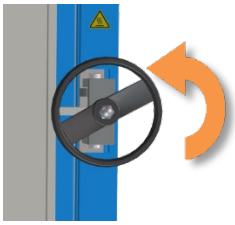
3. Tighten the handle wheel.

- Turn the wheel a **maximum of 3 more times** to tighten the door handle.
    - **Do not force or overtighten the wheel**. This can damage the door handle or latch.

4. Pump down the oven chamber to seal the door. See page 45.

5. Loosen the handle wheel after the oven chamber pressure drops below 400 Torr.

This helps safeguard against overpressurizing the chamber while backfilling.



- Turn the wheel **3 times** counterclockwise (to the left) to loosen the handle.
- Leave the handle facing forward. This prevents the door from springing open if the chamber is overpressurized.

PUMP DOWN THE OVEN CHAMBER

Note: **Perform a Full Vacuum pump down of the chamber for at least 10 minutes** when first putting the oven into operation in a new location to verify the vacuum supply system integrity.

An operator must always be present to observe the vacuum gauge pressure display decreasing while the oven is drawing a vacuum to ensure the system is sealed. The oven door must be closed and latched prior to pumping down the chamber.

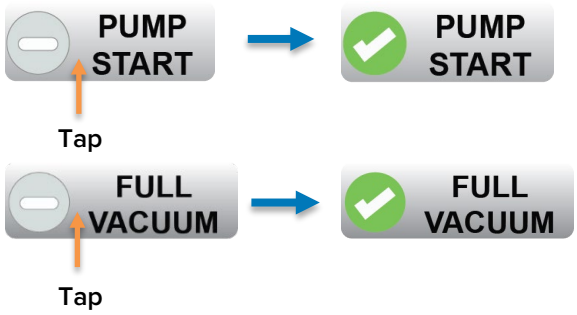
Reminder: Loosen the chamber door handle **after the oven chamber pressure drops below 400 Torr**. See page 44.

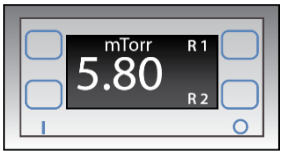
Vacuum Options

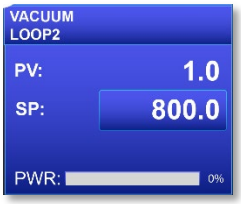
There are 3 options for pumping down the chamber.

Option 1 – Manual Full Vacuum

Opens the vacuum valve to its maximum position.



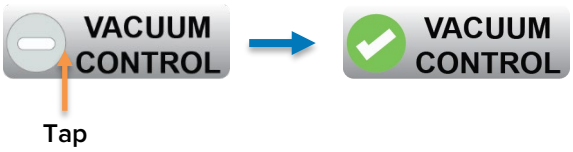


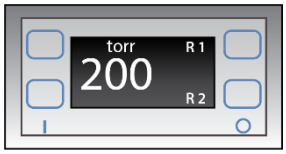


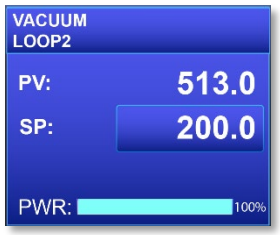
1. Tap Pump Start to turn on the oven vacuum pump.
2. Tap the Full Vacuum button on the homepage, fully opening the vacuum valve.
    - The chamber pumps down to the lowest achievable pressure.
    - **Reminder:** The main controller vacuum tab does not display a PV of less than 1 Torr.
3. Loosen the chamber door latch, leaving it in position facing forward.

Option 2 – Manual Vacuum Control

Pumps down the oven chamber to a setpoint between room pressure and 1 Torr.





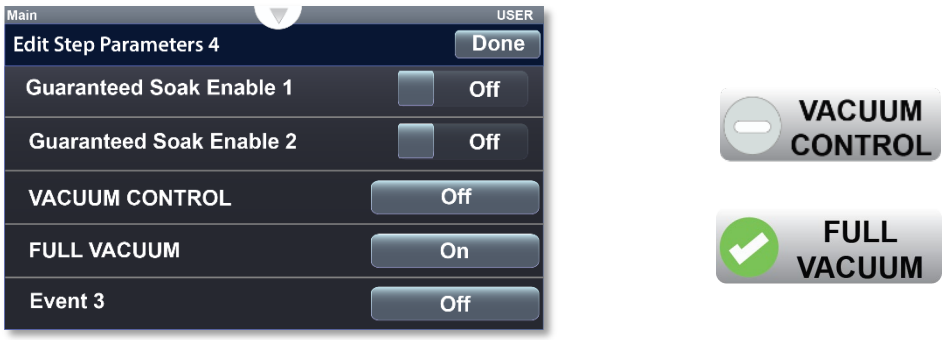


1. Enter a vacuum setpoint between 1 Torr and 760 Torr on the homepage vacuum tab.
2. The manufacturer strongly recommends entering an initial setpoint of at least 500 Torr to ensure the oven chamber seals completely.
3. Tap Pump Start to turn on the oven vacuum pump.
4. Tap the Vacuum Control function, partly opening the oven vacuum valve.
    - The oven will pump down to and then maintain the vacuum tab setpoint.
5. Loosen the chamber door latch, leaving it facing forward.

Option 3 – Profile Automation

Note: Pump Start cannot be turned on automatically. An operator must always be present to turn on the vacuum pump and verify the oven chamber is sealed as the oven pumps down.

The Vacuum Control or Full Vacuum functions may be set to automatically turn on as part of a heating profile. See page 49.



Profile Programming Menu Step Events: Full Vacuum Function On

Reminder: One of the vacuum functions must be turned on during each step in which the chamber will be pumping down or holding a vacuum level.

End of Procedure

BACKFILL THE CHAMBER

Atmosphere is restored to the chamber in two stages.

Stage 1: Automatic Partial Backfill

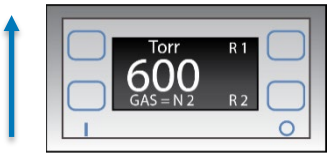
Two triggers cause the oven to close the vacuum valve and partly backfill the oven chamber to approximately 600 Torr.

Manual Trigger

When **both** vacuum functions are manually turned off.

Profile Automatic Trigger

When an active profile reaches a step in which both vacuum function event parameters are turned off.



Profile Exception: If a vacuum function is turned on during the End step of a profile, the oven will hold the chamber under vacuum indefinitely with the vacuum valve open and the backfill valve closed.

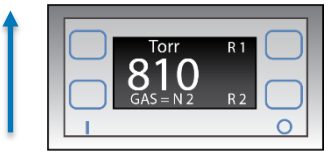
Stage 2: Manual Backfill to Room Pressure

1. Press and hold the Stop / Backfill button.

- Release the button when the chamber has backfilled to room pressure.
- The oven door can be opened when the chamber is at room pressure.

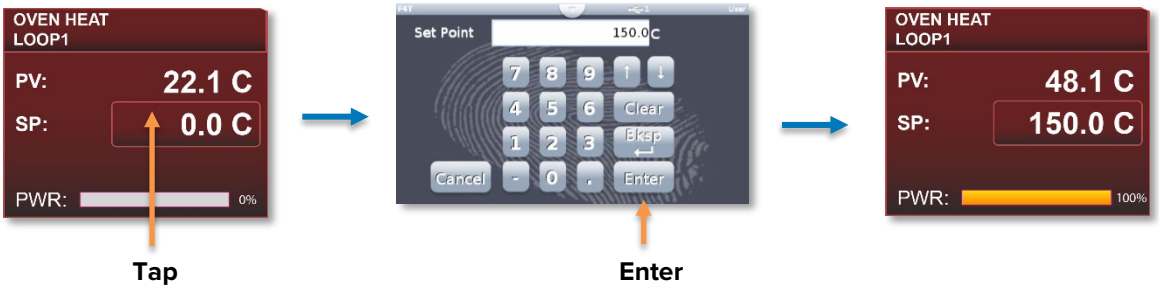
Stop / Backfill

Press and Hold



Note: Heating to your baking application temperature with atmosphere in the chamber will result in a drop in temperature when the chamber is pumped down. It may also oxidize chamber surfaces.

Setting a Constant Temperature Setpoint



1. Tap the Setpoint button on the Homepage oven temp tab.
2. Enter a temperature setpoint.

To end constant temperature heating, enter a setpoint of 0.

Heating Profiles

Please see the *Profile Programming Manual* document for instructions on how to program automated recipe profiles. The guide comes included with the oven and provides illustrated explanations for all major functions and programming steps.

Profile Reminders:

- The operator must manually turn on Pump Start to allow the chamber to pump down during the profile.
- The Start 1 button on the control panel launches Profile 1. Start 2 launches Profile 2.

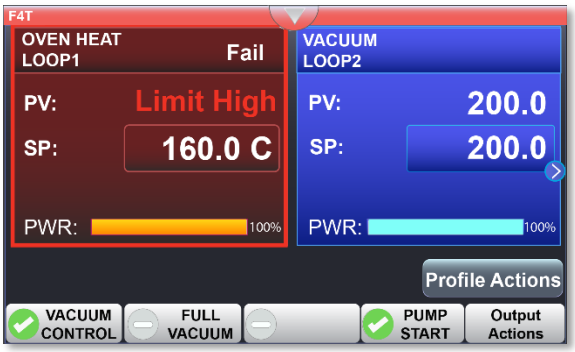
Profile Status Icons

Active (Running)	Paused	Completed	Terminated
			

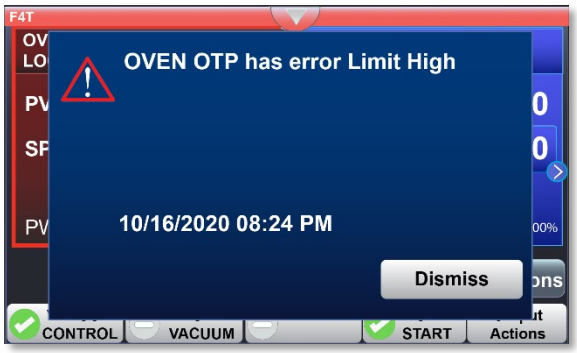
OVEN LIMIT ACTIVE

Limit activations serve as a persistent, protective interruption of heating in the oven chamber. **Always identify and correct** the cause of an oven limit activation before restoring heating.

Oven Limit Heating Cutoff Active



In this example, the chamber temperature exceeds both the Oven Limit Setting and the Temperature Setpoint.



Note: Tapping Clear or Dismiss on the Alert Window does not end the Oven Limit. It only closes the window.

The red Alarm Light on the Control Panel illuminates steadily during an oven limit cutoff.

Note: The oven chamber **is not heating** in the example above. The power bar (PWR) indicates the oven controller is calling for power to the heating elements. However, the active Oven Limit system is routing power away from the elements.

Possible Limit Activation Causes

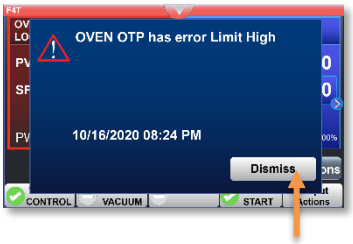
- Launching a heating profile with a temperature setpoint near to or exceeding the current Oven Limit setting.
- An external temperature source or a heat source in the oven chamber is pushing the oven temperature to or above the Limit setting.
- The temperature controller circuitry or sensor probe has failed, allowing uncontrolled heating in the chamber to meet or exceed the Oven Limit setting.

If you suspect a hardware failure or an ignition even in the chamber, **turn off the oven and wait for the oven to cool to room temperature before backfilling the chamber.**

Continued next page

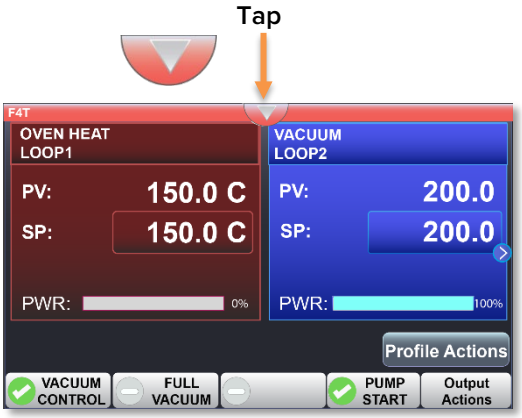
Clearing an Active Limit Cutoff

The oven shelving temperature must be below the Oven Limit setting before a Limit cutoff can be cleared (canceled).

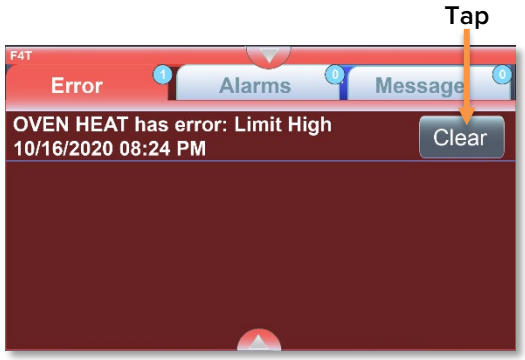


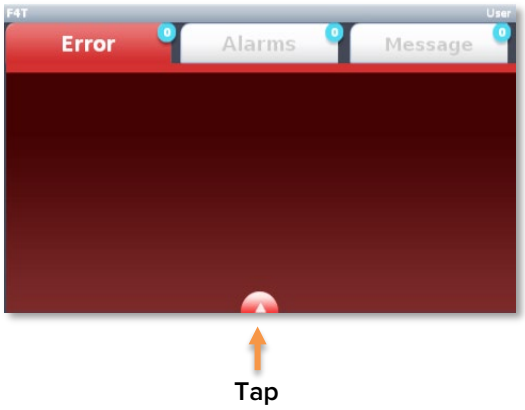
Alarm Message: This alert window appears the first time a button is tapped during a Limit cutoff. Tap Dismiss to close the message.

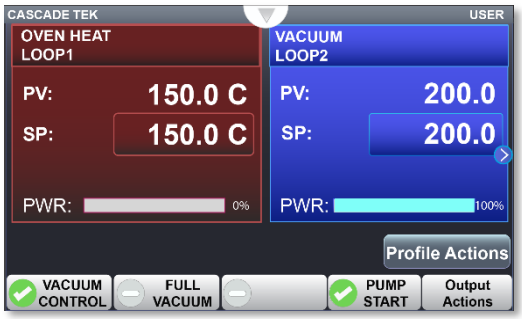
Always identify and correct the cause of an Oven Limit activation before restoring heating.



Oven temperature is below the High Limit setpoint.







1. Tap the Down arrow on the top ribbon to bring up the Error screen.

2. Tap the Clear button on the Error screen to cancel the Oven Limit temperature cutoff.

3. Tap the Up arrow at the bottom of the screen to return to the homepage.

The red Alarm Light on the control panel will turn off automatically once the Oven Limit activation has been cleared.

DATA PORTS

Front of Unit

Control Panel USB A

The USB port located on the front control panel accesses the Main and High Limit controller and can be used for the following:

- Exporting and importing heating profiles from the controller
- Updating firmware

Back of the Unit

Ethernet

The ethernet port located on the back of the oven accesses the Main and High Limit controller. With the correct configurator software, the port can be used for the following:

- Downloading profiles and uploading profiles to the controller.
- Programming heating profiles in a desktop or laptop environment.
- Backing up and loading backed up oven configurations.

OVEN COOLDOWNS

The oven chamber is well insulated and requires a significant amount of time to cool down while remaining sealed.

- 6 hours may be required to cool down from 150°C to 100°C.
- 16 hours may be needed for the oven to return to room temperature cooling from 150°C.
- Backfilling the oven with N_2 does not significantly increase the rate of cooling.

Introducing free atmosphere into the oven chamber at temperatures above 100°C risks oxidizing chamber surfaces.

Warning: Disconnect the unit from its power supply prior to maintenance or service.

Avertissement: Avant d'effectuer toute maintenance ou entretien de cet appareil, débrancher le cordon secteur de la source d'alimentation.

CLEANING

If a hazardous material or substance has spilled in the unit, immediately initiate your site Hazardous Material Spill Containment protocol. Contact your local Site Safety Officer and follow instructions per the site policy and procedures.

- Do not use spray-on cleaners or disinfectants. These can leak through openings and coat electrical components.
- Do not use cleaners or disinfectants that contain solvents capable of harming paint coatings or stainless-steel surfaces. **Do not use chlorine-based bleaches or abrasives; these will damage the chamber liner.**
- Consult with the manufacturer or their agent if you have any doubts about the compatibility of decontamination or cleaning agents with the parts of the equipment or with material contained in it.

Warning: Exercise caution if cleaning the unit with alcohol or flammable cleaners. Always allow the unit to cool down to room temperature prior to cleaning and make sure all cleaning agents have evaporated or otherwise been completely removed prior to putting the unit back into service.

Avertissement: Soyez prudent lorsque vous nettoyez l'appareil avec de l'alcool ou des produits de nettoyage inflammables. Laissez toujours refroidir l'appareil à la température ambiante avant le nettoyage et assurez-vous que tous les produits de nettoyage se sont évaporés ou ont été complètement enlevés avant de remettre l'appareil en service.

Oven Chamber Cleaning Guidelines

1. Remove any removable chamber accessory items, such as shelving, if present.
2. Use 99% isopropyl alcohol to clean chamber surfaces and shelving. Apply using lint-free wipes.
3. Take special care when cleaning around temperature sensor probes. Do not clean the probes.
4. Clean all removable accessories and components.
5. Verify the cleaning alcohol has evaporated completely from all chamber surfaces and accessories prior to reconnecting the unit to its power source.

Maintaining Atmospheric Integrity

Periodically, inspect the door latch, trim, catch, and gasket for signs of deterioration. Failure to maintain the integrity of the door system shortens the lifespan of the unit.

Gaskets

The door gasket is a low-wear item. It typically only needs to be replaced due to being cut or nicked. The risk of this type of damage can be significantly reduced by opening the door to 130°, keeping it well out of the way of shelves or sample trays being removed from or inserted into the chamber.

Replacement Procedure: The manufacturer recommends having a rubber mallet and exam gloves on hand to perform this procedure. Cover the mallet head with a clean plastic bag to help reduce contamination of the door. Wearing exam gloves likewise reduces the chance of contaminating the chamber door interior.

1. Remove the old gasket by pulling it out of the gasket well in the door.
2. Insert a few centimeters (inches) of the narrow side of the replacement gasket into the gasket well on the top of the door.
3. Insert a few centimeters (inches) of the gasket's narrow side gasket into the well on the bottom of the door.
4. Insert a few centimeters (inches) of the narrow side of the gasket into the well on the left side, then on the right side of the door.
5. Continue around the door in this fashion, alternating sides.
    a. The rubber mallet can be used to help seat the gasket. Use moderate strokes.

Electrical Components

Electrical components do not require maintenance. If the oven fails to operate as specified, please contact your distributor or **Customer Support** for assistance.

Storage

To prepare the unit for storage, remove all shelves, dry the chamber completely, and disconnect the power supply. Verify that the door is positively locked in the closed position.

UNIT SPECIFICATIONS

This oven is a 220 – 240 volt unit. Please refer to the oven data plate for individual electrical specifications.

Technical data specified applies to units with standard equipment at an ambient temperature of 25°C and at nominal voltage. The temperatures specified are determined in accordance with factory standards following DIN 12880 respecting the recommended wall clearances of 10% of the height, width, and depth of the inner chamber. All indications are average values, typical for units produced in the series. We reserve the right to alter technical specifications at all times.

WEIGHT

Shipping Weight
1634 lb / 742 kg

DIMENSIONS

Inches

Exterior W × D × H	Interior W × D × H
38.7 x 46.8 x 70.4 in	28.8 x 26.0 x 24.5 in

Millimeters

Exterior W × D × H	Interior W × D × H
983 x 1189 x 1787 mm	730 x 660 x 622 mm

CAPACITY

Cubic Feet	Liters
10.6	300.0

SHELF CAPACITY BY WEIGHT

Per Shelf	Maximum Total Load	Max. No. Shelves
50.0 lb / 22.7 kg*	200.0 lb / 90.7 kg**	8 Shelves

*50.0 lb / 22.7 kg with weight evenly distributed across the shelf.
**200.0 lb / 90.7 kg total load in the chamber. Exceeding this limit risks damaging the chamber liner.

VACUUM

Operational Vacuum Range*

torr	mbar
720 to less than 10 mTorr @ 150°C	910.5 to <0.0319 @ 150°C

*Pump dependent.

Vacuum Display Range

torr	mbar
1100 to 0.1 mTorr	1466 to 0.001

Leak Rate

Rate
Less than 30 mTorr per 30 minutes @ ambient temperature

TEMPERATURE

Range, Stability, and Uniformity

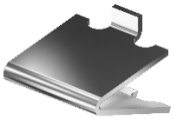
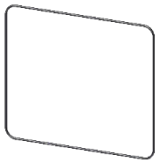
Range	Stability	Uniformity
Ambient +10° to 220°C	± 0.2°C @ All Temps	±6% of Setpoint

POWER

Model	AC Voltage	Amperage	Frequency
SVO-10-VC	220 – 240	30	50/60 Hz


CASCADE™
TEK

REPLACEMENT PARTS

Description	Parts Number	Description	Parts Number
Adjustable Leveling Feet	 **2700506**	Shelf	 **9751299**
Shelf Clip, Individual (1)	 **1250510**	Viton Door Gasket 110.5” (2807 mm)	 **3450755**

Ordering Parts and Consumables

Parts may be ordered from Cascade TEK by calling 1-888-835-9250. Please have the **model, part,** and **serial** numbers, and **Part ID** of the unit ready, as Customer Support will need this information to match your unit to its correct part.

Corporate Headquarters
Cascade TEK Solutions LLC
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Plano TX 75074
USA

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1-888-835-9250
1-971-371-4096